

THE IRVING

DEVOTED TO THE INTERESTS OF THE AMERICAN SOCIETY FOR STEEL TREATING

Volume VI

Entered as Second Class Matter, July 26, 1930, at the Post Office at Cleveland, Ohio, under the Act of March 3, 1879

JANUARY, 1933

JAN 23 1933

No. 1

508 AT CINCINNATI STAINLESS MEETING

M. A. Grossmann and D. T. Haddock Make Subject Interesting

By N. C. Strohmenger

The regular Cincinnati meeting held Nov. 10 was a joint meeting with the Cincinnati Engineers' Club and the Cincinnati chapter of the American Institute of Architects. John T. Faig, president of the Ohio Mechanics Institute, was the presiding officer.

The main speakers of the evening were Dr. Marcus Grossmann, metallurgist of Illinois Steel Co. and D. T. Haddock, consulting engineer of American Sheet & Tinplate Co., who spoke on the subject of "Stainless Steel." These two authorities gave a comprehensive presentation of the essential facts pertaining to the origin, structural differences and commercial developments of chromium and chromium nickel steels.

After hearing Dr. Grossmann and Mr. Haddock you could hardly believe we could have had this subject presented in any more interesting technical and practical way.

Mr. Harris of General Alloys Co. briefly mentioned the stainless steel castings made for various purposes and how permanent paints can be embedded in them.

A special feature of this meeting was a generous exhibit of stainless steel products presented in a classified display through the courtesy of the stainless steel industry. There were 508 in attendance at this meeting.

TELLS PROGRESS IN MACHINE FORGINGS

E. R. Frost Tells Ontario How Modern Machines Function

The Ontario chapter met in Hamilton on Oct. 14. About 100 heard a coffee talk by Gordon C. Brown of Pyrene Co. on "Fire-fighting in Steel Treating Plants," and later heard E. R. Frost, president of National Machinery Co., Tiffin, Ohio, give a paper on the latest developments in machine forging.

His talk listed recent developments which included newer and more rigid forming machines and the still newer and more rigid presses used for both cold and hot pressing of metals, ferrous and non-ferrous, of sizes and forms not hitherto attempted.

In the production of bolts, Mr. Frost pointed out that in the new rigid machines the sharpness of the corners was much increased and the flash greatly reduced.

In wire drawing and in extrusion of metals it appears that the force required to keep the metal in motion may actually grow less toward the end of the operation, if the rate of flow is maintained, due, perhaps, to some internal heat produced at a certain rate of flow.

Working along lines suggested by this, new heavy presses were designed which were still more rigid than the best forging machines and had a greater number of strokes per minute. The press produced work of such accuracy that much or all machining could be eliminated and the variations in weight of parts could be kept to very small amounts. In addition the density, smoothness, strength and other physical properties of the metals were greatly improved. The stresses in the metal were apparently more uniform and very little tendency to spring back was shown.

DESCRIBE BERYLLIUM COPPER

Authoritative Data Given in Booklet Obtainable by Writing A. S. S. T.

Beryllium copper's engineering properties are thoroughly covered in a new publication of American Brass Co. Its physical properties show a remarkable improvement after heat treatment—higher tensile strength, fatigue limit and hardness than any copper alloy heretofore produced commercially.

A.S.S.T. headquarters, 7016 Euclid Ave., Cleveland, will see that you get a copy.

EXPLAINS SPECTROGRAPHY TO 300 AT HARTFORD'S MEETING

C. C. Nitchie Talks Nov. 15

By J. P. Howley

Charles C. Nitchie, industrial sales division, Bausch & Lomb Optical Co., spoke before 300 members and guests of the Hartford chapter, and the Hartford Engineers Club, at a joint meeting held Nov. 15. J. H. G. Williams, chairman of the chapter, introduced the speaker whose subject, "The Spectrograph as an Industrial Tool," proved to be of great interest.

Mr. Nitchie said that "Modern manufacturing requirements have developed a need for more deeply searching methods of analysis than have heretofore been available. This has led to the widespread use of methods formerly confined to theoretical and academic fields such as spectrographic analysis."

"Intensive work during the last ten or fifteen years has so developed the technique of spectrography that the chemist may now obtain not only complete qualitative information as to the components of materials, but may also make this information quantitative."

Mr. Nitchie also showed the film, "Eyes of Science," portraying the principles and use of optical instruments.

METALLOGRAPHY OF STAINLESS STUDIED

F. B. Foley's Philadelphia Talk Creates Valuable Discussion

By Adolph O. Schaefer

Philadelphia chapter gathered on Nov. 25th for the third meeting of the season. The feature was F. B. Foley's talk on "Corrosion and Heat Resistant Steels." Mr. Foley, a member of Philadelphia chapter, is director of research at Midvale Co. His paper considered the metallographic development of the alloys used to resist corrosion and elevated temperatures.

He began with the fundamentals of the atomic arrangements in the space lattices of alpha, gamma, and delta iron. Then from an initial study of the iron-carbon diagram, consideration was given to the effects on this diagram of alloying elements most frequently used to compound steels resistant to corrosion and temperature.

Time was given to such questions as embrittlement, and the conflicting theories on this subject were explained in detail. Many photomicrographs were used to demonstrate the author's theories, as well as those of other investigators. The long discussion of the paper was enlivened by Dr. St. John, Dr. Nelson, and Mr. Mochel.

At dinner, Edwin B. Garrigues, who has just returned from Soviet Russia, projected several interesting reels of film he took in that vast country.

The chapter has combined with the local chapters of other societies to provide employment and relief for technical men in this area.

AUTHORS ABSTRACT CONGRESS PAPERS AT NEW YORK MEETING

All Are Members of Chapter

By F. H. Clark

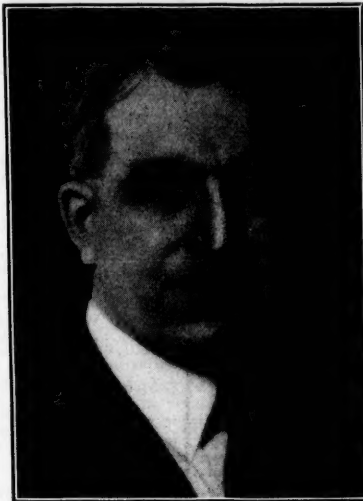
The New York chapter celebrated its December meeting by a special Christmas dinner. The program for the evening consisted of the presentation in shortened form of five papers given by members of the chapter at the annual convention in Buffalo.

E. S. Davenport presented "Factors Affecting the Inherent Hardenability of Steel" for E. C. Bain who was in Europe. H. J. French then read his paper entitled "The Role of Nickel in Nitriding Steels."

"The Temperature Atmosphere Problem in High Speed Steel" was presented by Sam Tour, after which C. O. Burgess discussed "The Effect of Small Percentages of Chromium on the Quality of Cast Iron." "The Copper Rich Alloys of the Copper-Nickel-Tin System" was the paper presented by J. T. Eash.

An unusually large number of members present showed the great interest displayed in this excellent group of technical papers.

F. G. Hughes is Promoted



Frederick G. Hughes was made general manager and vice-president of New Departure Mfg. Co., with plants at Bristol and Meriden, Conn., at the company's recent annual meeting.

Mr. Hughes has long been an active member of the Society and was its president during 1928. His connection with New Departure dates from 1911. He is a member of Hartford chapter.

Before his promotion, which became effective on Jan. 1, Mr. Hughes was vice-president and assistant general manager.

DESCRIBES ALLOY STEEL CASTINGS

J. H. Hall, in Talk at Lehigh, Stresses Manganese Steel

By O. V. Greene

On Nov. 4 the Lehigh Valley chapter had one of the most interesting and instructive meetings in recent years. The meeting was addressed by John Howe Hall, technical assistant to the president of Taylor-Wharton Iron & Steel Co., who spoke on the subject of "Alloy Castings."

Mr. Hall's talk covered the more important changes in recent years in regard to melting, analysis and heat treatment of alloy castings, particularly those with manganese up to 14 or 15%.

As cast, high manganese castings are extremely brittle. However, after water quenching from 1900° F. the steel is made entirely austenitic and can be bent 180° without failure.

Manganese steel castings formerly could not be successfully welded because there is a low temperature embrittlement back of the weld from a formation of carbide needles and also a high temperature embrittlement at the weld surface due to the formation of eutectic. A welding electrode has been devised, however, which contains from 12 to 15% manganese, 3 to 5% nickel and low carbon, and which forms no eutectic in the contact zone.

All stainless alloys that are produced in an ingot form and rolled into bars and shapes are now available as castings. However, the analysis limits required for some classes of service present extremely difficult problems to the foundrymen. The difficulty of machining certain of these alloys, particularly the 18-8 has been eliminated by the introduction of sulphur, selenium or tellurium.

PORTABLE TENSILE TESTER

Folder Describing Accurate, Portable Machine Available Thru A. S. S. T.

The Oxweld portable tensile testing machine developed by Union Carbide & Carbon Research Laboratories is described in a new publication of Linde Air Products Co. Complete instructions for operating this accurate, portable machine, and methods of preparing test coupons and of calculating tensile strength are given.

A copy of this 16-page booklet can be obtained through the national offices of the A.S.S.T., 7016 Euclid Ave., Cleveland.

OFFICERS FOR 1933 ASSUME NEW POSITIONS ON JAN. 1

W. B. Coleman Becomes President

On Jan. 1, 1933, William B. Coleman, president of W. B. Coleman & Co., Philadelphia, assumed office as president of the A.S.S.T. He was nominated at the annual meeting in Buffalo, Oct. 5, 1932, and was elected later by ballot of the secretary, according to the Constitution.

By the same procedure, William H. Phillips, vice-president of Molybdenum Corp. of America, Pittsburgh, assumed office as vice-president of the Society. William H. Eisenman succeeded himself as secretary.

New directors are Robert S. Archer, director of metallurgy for A. O. Smith Corp., Milwaukee, and Henry G. Keshian, metallurgist for Chase Companies, Waterbury, Conn. In addition to these men the 1933 Board of Directors includes A. H. d'Arcambal, president of the Society in 1932, Arthur T. Clarage, entering the second half of his two year term as treasurer, and two members of the 1932 Board whose terms have not yet expired—Harry D. McKinney, Harrison, N. J., and Charles F. Pascoe, Montreal, P. Q.

DESCRIBES MAKING STRONG CAST IRON

Hyman Bornstein Tells Detroit How to Manufacture Them

By O. W. McMullan

The Detroit chapter met on Jan. 9. The dinner was followed by a coffee talk from Leo Fitzpatrick, General Manager of Radio Station WJR. A report from the Educational Committee told of the series of metallurgical lectures to be presented this winter by members of our own chapter.

Hyman Bornstein, metallurgist of Deere and Co., Moline, who spoke on "Cast Iron as an Engineering Material," was introduced by A. L. Boegehold as technical chairman.

Gray iron may be classified according to strength, hardness, wear, shock resistance, or heat and corrosion resistance. Physical properties should be specified rather than chemical composition, except that it may be better to specify alloy content to secure machinability.

High strength irons were described. Up to six years ago 35,000 lb. was considered high strength but now 50,000 or above is necessary to be considered as such. They are produced through low total carbon (3% or less) in the cupola, electric, air, or rotary furnace.

Skill in operation is more important than the type of furnace. Special irons were described and illustrated by slides. A new wear resistant iron for brake drums with 24% chromium, 2% silicon and 1.8% carbon gives a structure like steel after annealing four hours at 1750-1800° F. and shows a tensile strength of 85,000 with a Brinell of 321-332.

Heat treatment may be annealing, quenching and drawing, or special. Low temperature annealing or aging is used to relieve stresses, 1250 to 1500° F. to improve machinability and up to 1800° F. for alloys.

NORTHWEST SPONSORS SHOW

Chapter Successfully Backs Show and Technical Program Dec. 1-3

Northwest chapter in cooperation with the Manufacturers' Association of Minneapolis successfully conducted its second annual Welding and Heat Treating Exposition, Dec. 1-3, 1932.

The exposition, held at the plant of the Caterpillar Tractor Co., consisted of displays, many of them in operation, by almost 25 companies in the welding and heat treating fields. Registration at the show and at the 5 technical sessions was over 1400.

Papers were presented on various phases of welding, heat treatment and the maintenance and restoration of plant equipment.

O. B. Wilson, formerly manager of the Cleveland office of Brown Instrument Co., has been appointed district manager in Texas, Louisiana and Southern Arkansas, with headquarters at Houston.

JEFFRIES & SYKES TELL OF ALLOY 548

Cleveland Learns About Brand New Cutting Material

By H. B. Pulsifer

On the 16th of January the Cleveland chapter met for its star session of the present season—to welcome the first announcement of the new cutting alloy just developed by W. P. Sykes of General Electric Co.

Chairman Van Horn had provided a galaxy of talent for the hundred diners and the additional 200 who came in later. Harry Howlett, of radio station WHK, came first with his matchless artistry: his talk was entitled "Behind the Scenes in Radio." President Wickenden, of Case, welcomed the membership to the free course in Modern Metallurgy with a few masterful words about engineering education. National Secretary Eisenman then cleared away any doubts about the advantages of belonging to the A.S.S.T. with a few scintillating remarks.

Doctor Zay Jeffries was then presented by the chairman and gave a splendid review of the expectations and uses of modern cutting tool alloys. He concluded with the announcement of the new alloy and the field it is expected to benefit. The material is called "Alloy 548" for the present; it can be cast, forged, machined and heat treated; it has a moderate price.

With very complimentary remarks, Dr. Jeffries presented "Bill" Sykes who had himself largely developed the alloy at the Cleveland Wire Works. Only accessory constituents had been added from the work of C. B. Miller, of England.

Having excellent slides to show the constitution and structures of the alloys. Mr. Sykes then gave a general account of the tungsten-iron-cobalt series in which the new cutting alloy is found. It is not a carbon-bearing alloy but depends upon precipitation hardening for its properties. The new alloy has remarkably high and permanent "red-hardness" properties and promises to find a field of its own in industry.

A 6 page article on Alloy 548 will appear in the February issue of Metal Progress, to be mailed about Feb. 1.

ALUMINUM TESTING IS CHICAGO TOPIC

R. L. Templin Tells How to Interpret Test Results

By A. W. Sikes

Chicago chapter held its regular monthly meeting on Nov. 10. Approximately 100 members attended the dinner and as many more came in afterward.

Chairman Walther Mathesius presided and introduced J. E. Robinson, supervisor of metallurgy of International Harvester Co., as technical chairman for the evening, who, in turn, introduced the speaker, R. L. Templin, chief engineer of tests, Aluminum Co. of America.

Mr. Templin began his talk by giving a definition of tensile strength, yield point for ferrous metals and yield strength for non-ferrous metals, the latter characteristic being defined as equal to the stress corresponding to a permanent set of 0.2%.

Sampling for testing is very important. It has been found important to keep the geometric relations of the test pieces consistent; for instance, in testing aluminum samples, the gauge length is always four times the diameter.

Several slides were shown illustrating the familiar stress-strain graph for various materials, and the relation between tensile strength and cold work and hardness for various materials. One of the graphs showed 0.02% reduction in density after severe cold work, which is contrary to the popular belief that cold working tends to increase the density of materials.

The speaker stated that the correlation between cold work and tensile strength is very good while the correlation between Brinell number and tensile strength is not so good. There is also a good correlation between tensile strength and fatigue strength based on complete reversals of stress.

THE REVIEW

Devoted to the interests of the American Society for Steel Treating

A Review of the Activities of the Chapters and National Organization of the A. S. S. T.

Published November, January, March, May, July and September by the
AMERICAN SOCIETY FOR STEEL TREATING
7016 Euclid Ave., Cleveland, O.W. B. COLEMAN, President
A. T. CLARAGE, Treasurer
A. H. D'ARCAMBAL, Director
C. F. PASCOE, DirectorW. H. PHILLIPS, Vice-President
W. H. EISENMAN, Secretary
H. D. MCKINNEY, Director
R. S. ARCHER, Director

H. G. KESHIAN, Director

Subscription \$5.00 a year; 5 cents a copy

RAY T. BAYLESS Editor
JOHN G. MAPES Managing Editor

Volume VI

Cleveland, O., January, 1933

No. 1

3 MEETINGS COVER
WIDE TOPIC RANGENorthwest Studies Ballistics,
Refractories and Welding

By T. P. Hughes

Members and friends of the Northwest chapter were treated to an able presentation of the subject of ballistics at the November meeting. The speaker was C. F. Reed, chemical engineer and ballistics expert of the Federal Cartridge Co.

The speaker discussed the many factors which enter into the production of shells. One of the problems, the speaker pointed out, was the selection of a suitable steel for punches, blanking and drawing dies to be operated at a high rate of production. Hardness is a major requirement although the tools must also have a high degree of toughness. Carbon steel, practically untempered, is found by this company to give the best results.

Material for cartridge shells must have sufficient strength to withstand compressive stresses during the explosion of the charge and must also provide good drawing and forming properties. Copper alloys used for this work must be of a low silicon content to avoid excessive abrasion during forming. A lively discussion followed.

On Nov. 30, the Northwest chapter was addressed by Gray Morgan, ceramic engineer, General Refractories Co., Chicago. All those who are associated with the application and use of heat and high temperatures realize that the selection of the proper refractories constitutes an important problem. Involved in this selection are strength, adaptability as to shape and size of solids, ease of depositing plastic materials, resistance to softening and abrasion, porosity and general heat insulating properties.

Mr. Morgan ably discussed the raw materials, methods of manufacture, and properties of the various refractory materials now in demand by industry. The discussion which followed revealed general interest in the matter of refractories.

On Dec. 20, members of the Northwest chapter had the pleasure of greeting and listening to the man who in 1919 served as the first chairman of the chapter, C. S. Moody, now metallurgical engineer of Northwest Engineering Co., Green Bay, Wisconsin. His subject was "Shielded Arc Welding and Metallurgy." The attendance was the largest of the year.

The welding arc is shielded, the speaker said, to (1) provide mechanical shielding to the arc, (2) to provide a reducing gas around the vaporized metal, and (3) to provide a slag covering to protect the metal from the air and prolong the cooling rate.

Electrode covering is either wood fiber or metallic coatings. Mr. Moody reported that elastic limits of 40,000 lb. and tensile strength of 60,000 lb. are consistently obtained in bars welded with the shielded arc and rods of approximately 0.18% carbon. He also pointed out that impact bars of completely deposited metal absorbed 38-40 foot pounds of energy in the Charpy test.

The chief drawbacks to the use of the shielded arc are the gas odor emitted, the necessity for cleaning the deposited slag after each pass and the fact that, due to spattering, waste ends and sheath, only 50% by weight of the electrode is actually deposited.

NEW METALLOGRAPHY BOOK

A new book on metallography has been written by Dr. L. W. Eastwood, Michigan College of Mining and Technology, Houghton, Mich. The book covers the theories and methods of metallography, is well illustrated and contains two appendices dealing with photographic work and the preparation of specimens in the laboratory. Price is \$2.50. Order direct from the college.

DETROIT HAS TALK
ON GAS CARBURIZINGE. A. Thomas Describes Furnace
Handling 450 lb. an Hour

By O. W. McMullan

The second regular monthly meeting of the Detroit chapter was held Nov. 14. This was designated as Homecoming Meeting, as one of our former members, E. A. Thomas, metallurgist at the Newcastle plant of Chrysler Motor Corp., was the speaker. His subject was "Gas Carburizing." The Chrysler Corp. here invited inspection of their newly installed gas carburizing furnaces during the afternoon.

Mr. Thomas confined his talk largely to the description and operation of the continuous gas carburizing furnace installed by the Surface Combustion Company at the Chrysler Newcastle plant. One of these furnaces is used for carburizing steering worms and sectors at the rate of about 450 pounds per hour. Another furnace is used to carburize the free wheeling drive shaft or "pine-apple."

Difficulties of the process were the necessity of processing the alloy retort and trays for several weeks before satisfactory depth and uniformity of case were obtained. Even one new tray of 35% nickel, 15% chrome type will produce poor results in the work on and near the tray. This was attributed either to the catalytic action of nickel on methane (natural gas was used) or the inhibiting action of the nickel carbonyl gas with CO. There is no such effect with a 30% chrome, 8% nickel alloy. Other disadvantages stated were need for continuous operation to secure economy, lack of flexibility for case depth. Tray life is not good unless perfect castings are used.

First cost is similar to batch type equipment of the same capacity. Cost of gas and fuel is 0.1 cents per pound for 0.040 in. case depth and 0.2 cents per pound for 0.080 in. case depth. Total cost is about five times these amounts. Less than one man's time is used to operate the furnace. Cleanliness of operation is obtained, good case depth and control of carbon content are obtained after standardized conditions are reached and continuous operation is maintained. Penetration rate is quite high, being about 0.010 in. per hour with 1315 type of steel. The method is ideal for direct quench.

SHOWS COSTLY ALLOY STEELS
ARE OFTEN CHEAP IN BRIDGES

C. R. Young Talks at Ontario

Ontario chapter met in Toronto on Nov. 4. After the dinner a Coffee Talk was given by Dr. H. B. Speakman, director of the Ontario Research Foundation, who took up some of the problems the Foundation is trying to solve for the farmers, in connection with both animal husbandry and field crops.

Professor C. R. Young gave a very instructive paper on "The Use of Special Steels in Bridge-building." The special steels are not only higher in price per pound but cost more to fabricate. In some cases, however, it has proved not only mechanically advantageous, but even less expensive to use special steels for certain portions of a bridge. In one case about \$600,000 was saved by using heat treated eye bars of silicon steel. In some instances there would be no advantage in a special steel as a certain size would be desirable to reduce vibration or a certain weight might be wanted as in parts of a cantilever bridge.

Reference was made to the use of the higher carbon steels, as in suspension cables, and to the disappointing results obtained from heat treated wires under creeping stresses, in spite of what looked like the very favorable results of experiments.

Programs of
the Chapters
Addresses of SecretariesBOSTON—H. E. Handy, Saco-Lowell Shops, Biddeford, Me.
Feb. 3—Gas in Heat Treating ... R. J. Cowan
Mar. 3
Apr. 7
May 5BUFFALO—T. H. Burke, Otis Elevator Co.
Feb. 9—Local Talent Night Tentative
Mar. 9—Welding Norman Wilson
Apr. 13—Machinability J. V. Emmons
May 11—Annual MeetingCHICAGO—John Comstock, Room 1724, 122 So. Michigan Ave.
Feb. 9—Practical Metallurgy ... H. B. Knowlton
Mar. 9—Die Castings D. L. Colwell
Apr. 13 Zay Jeffries
May 11—Stainless Steels T. H. NelsonCINCINNATI—N. C. Strohmenger, Tool Steel Gear & Pinion Co.
Feb. 9—Salt Baths H. W. Gager
Mar. 9—Steel Personality B. F. Shepherd
Apr. 10—Tri-Chapter Meeting in Cincinnati
May 11—AirplanesCLEVELAND—H. B. Pulsifer, Ferry Cap & Set Screw Co.
Feb. 6—Bridge Wire H. C. Boynton
Mar. 6—Grain Size M. A. Grossmann
Apr. 10—Aluminum F. C. Frary and G. D. WeltyCOLUMBUS—L. H. Marshall, 271 Winthrop Rd.
Feb. 7—Salt Baths H. W. Gager
Mar. 7—Machinability B. F. Shepherd
Apr. 10—Tri-Chapter Meeting in Cincinnati
May 8—Plant VisitDAYTON—F. M. Reiter, Dayton Power & Light Co.
Feb. 13—Salt Baths H. W. Gager
Mar. 13—Machinability B. F. Shepherd
Apr. 10—Tri-Chapter Meeting in Cincinnati
May 8—Plant VisitDETROIT—Gordon Webb—Room 410, Donovan Bldg.
Feb. 13 H. J. French
Mar. 13—Gears E. F. Davis
Apr. 10—Steel C. H. Herty, Jr.
May 8—Plating G. B. HogaboomHARTFORD—James Allison, Union Drawn Steel Co.
Feb. 14—Atmosphere Control A. N. Otis
Mar. 14—George Washington Bridge C. M. Jones
Apr. 11—Steel Castings E. S. Gardner
May 9—Open DiscussionINDIANAPOLIS—R. L. Fitzsimmons, 1426 No. Drexel Ave.
Feb. 13—Salt Baths H. W. Gager
Mar. 10—Steel Personality B. F. Shepherd
Apr. 4—Aluminum S. A. Silberman
May 2—Pyrometry S. A. SilbermanLEHIGH VALLEY—H. Gifford, Bethlehem Steel Co., Bethlehem
Feb. 3—Annual Dinner
Mar. 3—Gas Atmospheres Sam Tour
Apr. 7—Deep Drawing Joseph Winlock
May 5—Tool Steel A. W. F. GreenNEW HAVEN—R. T. Porter, Heppenstall Forge Co., Bridgeport.
Feb. 24—Cast Iron J. T. MacKenzie
Mar. 23—Furnace Atmospheres E. G. de Coriolis and A. N. Otis
Apr. 20—Age Hardening H. A. Bedworth
May 18—Steel Personality B. F. ShepherdNEW JERSEY—J. H. Johnson, 345 Mountain Ave., Springfield, N. J.
Feb. 13—Metallurgy J. A. Matthews
Mar. 13—Nitriding J. H. Higgins
Apr. 10—Magnesium Alloys John A. Gann
May 8—Sustaining Member NightNORTHWEST—Alexis Caswell, 200 Builders Exchange Bldg., Minneapolis.
Feb. 20—Molybdenum Steels W. H. Phillips
Mar. 20—Die Castings D. L. Colwell
Apr. 11—Tool Steels A. J. Scheid, Jr.ONTARIO—L. F. Fitzpatrick, Flexible Shaft Co., Toronto.
Feb. 3—Nickel C. A. Crawford
Mar. 3—Stellite C. W. Drury
Apr. 7—Welding B. F. Shepherd
May 5—Steel PersonalityPHILADELPHIA—A. O. Schaefer, Midvale Co.
Jan. 27—Alloy Steels H. J. French
Feb. 24—Metallurgy O. E. Harder
Mar. 31—Nitriding A. B. Kinzel
Apr. 28—Steel Castings R. A. BullPITTSBURGH—H. L. Walker, Box 521, N. S. Station
Feb. 9 Earl Smith
Mar. 9—Open Hearths J. E. McLeod
Apr. 13—Steel Castings George Batty and C. H. Herty, Jr.
May 11—Non-ferrous H. Foster BainRHODE ISLAND—C. G. Peterson, Providence Gas Co., Providence.
Feb. 5
Mar. 6
Apr. 7
May 8ROCHESTER—L. C. Matthews, Eastman Kodak Co.
Feb. 13—Low Temperature Instruments R. E. Olson
Mar. 13—Wire Drawing K. B. Lewis
Apr. 10—Alloy Steels T. H. Wickenden
May 15—Annual MeetingSPRINGFIELD—E. H. Abbe, 17 Bayonne St.
Feb. 20—Tungsten Carbide F. C. Kelley
Mar. 22—Macro-Etch M. Yatskevitch
Apr. 17—Welding J. C. HodgeST. LOUIS—F. D. Burnett, Railway Exchange Bldg.
Feb. 17—Die Castings
Mar. 17—Nitriding
Apr. 21TRI-CITY—H. A. Deane, Deere & Co., Moline.
Feb. 7—Metallurgical Developments E. E. Thum
Mar. 7—Cutting Materials J. P. Gill
Apr. 4—Open
May 2—Machine Forgings J. H. FriedmanWASHINGTON—S. J. Rosenberg, Bureau of Standards
Mar. 17—Forging Adam Steever
Apr. 21WORCESTER—Theodore Packard, 1 Freeland St.
Feb. 15 or 16—Stainless J. L. McCloud
Mar. 15 or 16—Tool Steels A. H. d'Arcambal
Apr. 12 or 13—Magnesium J. H. Gann
May 10 or 11—Pressed SteelYORK—C. M. Strickler, General Machine Works.
Feb. 8—Welding T. M. Jackson
Mar. 8—Welded Structures Everett Chapman
Apr. 12—Arc Welding J. C. Lincoln

WANTED

No. 3-H Rockwell Hardness Tester.
Must be in A-1 condition and a bargain.
Address Box 1-60
AMERICAN SOCIETY FOR STEEL TREATING
7016 Euclid Ave., ClevelandSAYS MELTING IS
ART, NOT SCIENCEE. C. Smith Talks on Special
Steels at Chicago Meeting

By A. W. Sikes

The regular dinner meeting of the Chicago Chapter was held Dec. 8. Approximately 150 attended the dinner, an additional 100 arriving later.

In the absence of Chairman Walther Mathesius, Vice-Chairman A. W. Sikes introduced F. M. Dupont, vice-president of the Wahl-Henius Institute, who gave an especially interesting coffee talk on "A Short History of Brewing."

J. H. Nead, chief metallurgist of the Inland Steel Co. and past national director of the Society, who acted as technical chairman for the evening, was introduced by Mr. Sikes. Mr. Nead told the qualifications of the speaker, Earl C. Smith, chief metallurgist, Republic Steel Corp., who began his talk by delving into the history of special steels.

The speaker then stated that in his opinion melting will probably remain an art rather than a science for some time to come because of variations in the chemical elements and in the process which require a long period of training for the melter.

As an example of the variations in chemistry, we learned that oxygen may be employed with the other elements which Dr. Bain has designated as deep hardening in order to produce this result. Manganese is both deep hardening and an oxygen eliminator, and silicon is also in this class. Chromium is deep hardening but leaves residual strains which detract from the available strength in the finished steel. Nickel is another deep hardening alloying agent. Molybdenum and vanadium, when employed with other elements, produce shallow hardening.

In closing his talk Mr. Smith stated that it is significant that the depression has not brought forth new tools or new methods for steel production.

NEW FOLDER ON LUBRICANTS

Write to A. S. S. T. Headquarters for Your
Copy of this Useful Booklet

The third edition of the useful, 70-page booklet of D. A. Stuart & Co., "The Straight Line to Metal Working Efficiency," has recently been put out. It features a section devoted to data on the new S.A.E. extreme pressure gear and bearing lubricants.

Order a copy through the A.S.S.T. headquarters, 7016 Euclid Ave., Cleveland.

VIBRATING MOLDS
MAKE STEEL GOODGathmann Tells Baltimoreans
How Sound Steel is Made

By Stanley P. Watkins

The regular monthly meeting of the Baltimore group was held Nov. 28. In the absence of Chairman Alex. L. Feild, the well-attended meeting was presided over by Vice-Chairman H. C. Ballard.

The first speaker of the evening was John Elders, chief engineer of Crown Cork and Seal Co., Baltimore. Mr. Elders' talk concerned machine design in the light of more recent developments in the use of high-speed motion picture cameras in analyzing motions of machine parts.

The second speaker of the evening was Emil Gathmann, president of Gathmann Engineering Co., Baltimore. Mr. Gathmann demonstrated with models the two latest improvements in steel manufacturing as developed by his company, namely, the machinery for stripping big-end-up ingot molds, and a method for vibrating molds during casting.

The molds are cast in the usual way on cars of special design. When the molds are ready for stripping the cars are passed through the stripper. A plunger pushes the ingot from its seat through the plug hole and is automatically held in place by a pin. This effects a great saving in stripping time, cost, and completely eliminates "stickers."

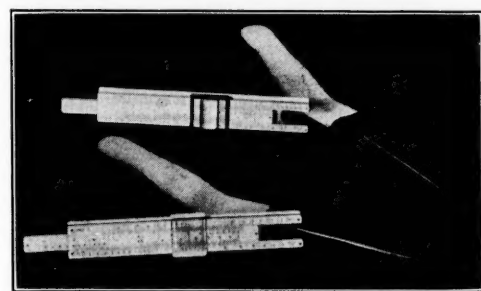
Mr. Gathmann then stated that when molds were vibrated during casting, splashing was largely eliminated. This is important as scabs, especially on sheets and strips, have been traced back to splashing on walls of molds during casting. A plunger from an air hammer strikes the outer edge of the mold and sets up vibration throughout the mold. It is desirable to secure vibration rather than a jarring effect. Mr. Gathmann stated that yield of rimming steels was increased by vibrating the molds.

HARRY HARDWICKE WITH ZIV

Harry Hardwicke, for 17 years associated with Ludlum Steel Co. and Atlas Steel Co., has become affiliated with Ziv Steel & Wire Co., Chicago, as sales executive. Mr. Hardwicke is well known in the Chicago district for his activity in the tool steel industry. He has been active in the Chicago chapter since its inception, serving the chapter for many years in an official capacity.

This POCKET SLIDE RULE

Really Works



This slide rule is indispensable in making frequent calculations in the plant, the laboratory or on the road. It's sturdily built and very accurate.

The rule is 5 inches long and has square, tangent, sine and logarithm scales in addition to the usual scales for multiplying and dividing. The divisions are ruled with extreme accuracy. Built of plied bamboo held rigidly by an aluminum frame, the rule will not warp or gather dampness in normal use. The slide is a sturdy metal frame protecting a solidly mounted glass. A magnifier available at slight additional cost, aids materially. . . . The price is only \$2.50 for the rule and leather case; with magnifier, \$3.00.

You can have the rule for 10 days free examination.

ORDER BLANK

To: AMERICAN SOCIETY FOR STEEL TREATING, 7016 Euclid Ave., Cleveland, Ohio

Please send me _____ pocket slide rules for 10 days free examination.

_____ rules without magnifier at \$2.50 each. _____ rules with magnifier at \$3.00 each.

() Cash enclosed. () Please render invoice and I will pay promptly

Name _____

Street and No. _____

City _____ State _____

FORGING EXPLAINED TO NEW JERSEY MEN

Adams is Speaker at Meeting
in Newark on Dec. 12

By Ernest O. Olds

The meeting of the New Jersey chapter on Dec. 12, held at Newark, brought forth many pleasant surprises, and was thoroughly enjoyed by the 145 present.

Chairman McWilliams early in the evening turned the gavel over to National Director McKinney, one of our own boys, who in turn presented William Coleman of Philadelphia, new president of the A.S.S.T., who gave a short talk on the Society.

Bill Eisenman, presented next, made an optimistic little talk which put everyone in the best of spirits. Director McKinney then introduced our good friend R. M. Bird, past president of the A.S.S.T., another favorite with our chapter.

The speaker of the evening was James R. Adams, superintendent of special products of Midvale Co. Mr. Adams' topic was "Forgings."

Mr. Adams started by explaining the factors that must be considered for different types of forgings, such as analyses, pouring temperatures, design and shape of the ingot molds, etc. He explained the types of work that were suitable for drop hammers, and other types that were readily adapted to press forgings.

He showed us step by step with the aid of slides, the manufacture of forgings. Many of the forging ingots weigh from 100 to 275 tons each and are forged into crank shafts, autoclaves, tanks, etc.

LOSE 20% MAKING CEMENTED CARBIDE

G. J. Comstock Tells New York
How New Material is Made

By F. H. Clark

The New York chapter held its November meeting on the 14th. Gregory J. Comstock, director of research of Firth-Sterling Steel Co., presented an informal discussion on "Hard Cemented Carbide Materials."

The cold press process for producing cemented carbide cutting tools is as follows: About 6.6 lb. of powdered materials of high grade purity are wet ground in ball mills and subsequently dried. Tungsten of 99.85% purity is used. The powder is placed in nickel boats in a stainless steel tube in a reduction furnace with hydrogen. A hydraulic press is utilized to shape the material before final sintering. During the last firing all dimensions decrease 20%.

One of the difficulties encountered with alloys of tungsten carbide and cobalt when steel was being machined was the development of a deep cavity back of the cutting edge. Tantalum carbide dissolved in the cobalt matrix has been an important factor in preventing this groove.

Tungsten carbide changes only slightly during the manufacturing process and yet small amounts of elements added to the binder produce great changes in the cutting properties of the tool. One of the recent developments has been an alloy that cuts quite rapidly a high carbon high chromium steel.

BOSTON BANQUETS SEPT. 23; HEARS DR. MATTHEWS NOV. 4

Annual Banquet 13th for Chapter

By Howard E. Handy

Over 150 members and guests of the Boston chapter attended the 13th Annual Banquet and Smoker held at the University Club on Sept. 23. Dinner, accompanied by music and entertainment, was followed by the motion picture, "The Span Supreme," depicting the construction of the Washington Bridge at New York.

The program was under the general direction of Frederick P. Flagg, assisted by E. B. Ashworth, E. L. Bartholomew, W. P. Knecht and G. H. Burnett.

The November meeting of the chapter was held Nov. 4, chairman E. B. Ashworth presiding.

Nearly 200 members and guests assembled to hear Dr. John A. Matthews, vice-president of Crucible Steel Co. of America, present a paper entitled "Corrosion Resistant Steels and the Things That May Happen to Them in Service."

BUFFALO SPEAKER STRESSES PRACTICAL USE OF WELDING

Wilson Discusses Maintenance

By Theo. H. Burke

Norman Wilson, master mechanic, Donner plant, Republic Steel Corp., addressed the Buffalo chapter on Dec. 8 on "Practical Welding." Mr. Wilson dealt with the various phases of electric and gas welding with particular reference to steel plant maintenance.

He stated that the variety of work to which the fusion welding process is applicable in a steel mill is almost inexhaustible. Bronze welding, for instance, is applicable to a great variety of applications. Bronze castings, such as valves, seats, locomotive crosshead shoes, bushings, etc., may be welded quickly and at small cost. One of the most important uses of Bronze welding is applied to cast iron, steam and water cylinders, large bed plates and underground water pipes, also heavy machine frames may be repaired very quickly. The application of this method of welding in overcoming the effects of electrolysis in centrifugal pumps is worthy of consideration. Bronze parts that had corroded were built up and outlasted the original.

The advantage of the shielded arc electrodes were pointed out along with many of the details of technique which should be observed in producing satisfactory work. Hard surfacing also attracted considerable attention.

ASKS STEELMAKERS FOR COMPLETE DATA

Rhode Island Hears Keshian
Talk on Tool Steels

By S. A. Woodruff

The Rhode Island chapter met Dec. 7 in the rooms of the Providence Engineering Society. The speaker of the evening was H. G. Keshian of the Chase Co., Waterbury, Conn. The subject of his talk was "Tool Steels—Their Classifications, Selection and Inspection."

Mr. Keshian began by stating his belief that the steel mills should be required to give full, definite numerical data on their products, and suggested a list of questions, to be answered by the prospective seller, to give information regarding wearing, impact, fatigue, shrinking and non-deforming characteristics, as well as more elementary information, such as physicals. This information would guide the user in selecting the right steel for the job.

The speaker next urged reduction of the number of types or brands of tool steel whenever possible and spoke of one instance where it was possible to reduce the number of brands carried in a stock room from over 100 to about a dozen.

In conclusion he discussed chemical analysis, hot acid etch and "personality" tests, as an aid in distinguishing different steels, and also in the inspection of each shipment of steel. He recommended actual service tests of material as being an excellent check on inspection.

The chapter was honored at this meeting by having President d'Arcambal with us. He spoke briefly of the National Society and of recent matters of interest and importance.

A. H. D'ARCAMBAL AT NOVEMBER MEETING OF PITTSBURGH MEN

Discusses Types of Tool Steels

By Geo. P. Halliwell

The November meeting of the Pittsburgh chapter was held in the Keystone Athletic Club. About 50 members sat down to dinner. The chapter was exceedingly fortunate at this meeting in being able to present a double feature in the shape of our National Secretary, William H. Eisenman, and our 1932 National President, A. H. d'Arcambal of Pratt & Whitney Co.

Secretary Eisenman, in his usual genial manner, told us of the excellent financial condition of the Society and of the general success of the convention at Buffalo. President d'Arcambal then gave a most interesting and practical talk on "Carbon, Alloy, and High Speed Tool Steels."

[Mr. d'Arcambal's chapter talks on tool steels have been abstracted several times in the REVIEW and he has requested that no further abstracts be made.—EDITOR.]

A lively discussion period followed which centered mostly on the application and use of chromium plated tools.

HELPFUL LITERATURE

Free for the Asking

300 Stainless Uses

Stainless steels are undoubtedly the most widely used of the alloy steels, according to the very interesting booklet on this subject just issued by Electro Metallurgical Co. Over 300 industrial uses of chromium and chromium-nickel steels are described in considerable detail. Attractively illustrated. Bulletin Ja-16.

Liquid Baths

A competent discussion of liquid baths for heat treating steel at temperatures from 350 to 1800° F. appears in a recent publication of E. F. Houghton & Co. A valuable chapter is devoted to the proper design of furnaces for use with liquid baths which lists 20 general furnace requirements. Bulletin Ja-38.

Atmosphere Control

Furnaces equipped with "Atmosphere Control" as manufactured by Hevi Duty Electric Co. are described in a new bulletin. Operation of the atmosphere control device is described and specifications are presented. The control features are applicable to both box and conveyor type furnaces. Bulletin Ja-44.

Ingot of Quality

Their new ingot stripper produces fine big-end-up ingots at lower cost than is now experienced in producing ordinary ingots of indifferent quality, says Gathmann Engineering Co. in a new booklet. Operation is economical even when the plant runs at only 10% of capacity. Bulletin Ja-13.

Tobin Bronze

Engineering data and colored photographs of interesting installations of Tobin Bronze are well combined in a booklet prepared by the American Brass Co. Results of varied tests on rods, shapes and plates make the booklet a useful reference source for this metal. Bulletin Ja-89.

Cut Forging Costs

An 8-page reprint has been issued by Electric Furnace Co. which illustrates various types of automatically controlled continuous, semi-continuous and batch type forging furnaces and shows the advantages and savings effected by the installation of modern forging furnaces. Bulletin Ja-30.

Automatic Control

How wide the field is for automatic control may be judged from a booklet of Brown Instrument Co. which illustrates a great variety of applications of automatic control units. The booklet also presents a good deal of technical information about Brown controls, what they do and how they work. Bulletin Ja-3.

Darkfield Microscopy

Comparison is made of darkfield and brightfield metallographic examination in a 16-page publication of E. Leitz, Inc. The equipment necessary for darkfield microscopy is described and prices are given. Several sets of micrographs of the same field contrast the two methods of illumination. Bulletin Ja-47.

Super Blowpipes

The advent of natural gas has made the replacement of many burners imperative. American Gas Furnace Co. describes in an illustrated folder blowpipes, ribbon burners, cross-fires, hand torches, etc., which are suitable for use with natural gas, propane and butane. Bulletin Ja-11.

Heating Units

An unique and very useful device for calculating heating units when figuring coiled units, covering wat-

tages from 275 to 1000, has been prepared by Hoskins Mfg. Co. Two slotted cards are clamped back to back through which various data can be read by adjusting a card which slides between. Bulletin D-24.

Fatigue Testing

That much discussed topic—fatigue testing—is covered in a publication of Thompson Grinder Co. Interesting data on fatigue of metals and a description of the rotating beam type of fatigue testing machine are presented. Bulletin D-23.

To Prevent Rust

The well known rust preventive, No-Ox-Id, is now available from Dearborn Chemical Co. as a foundation for paint. It is available in the colors red, gray or black. A booklet explains how maximum resistance to corrosion can be obtained. Bulletin Ju-36.

Titanium in Steel

An elaborate catalogue prepared for technical readers describes the use of ferro-carbon titanium in steel. Titanium Alloy Manufacturing Co. prepared it. The application of titanium in steels for forgings, castings, rails, sheets and plates is thoroughly described. Bulletin J-90.

Furnace Parts

Various parts for furnaces made from alloys manufactured by Driver-Harris Co. are pictured and described in an interesting publication. Complete performance data and specifications of Nichrome and Chromalox heat resisting alloys are given in the booklet. Bulletin N-19.

Homo Tempering

The use of the Homo furnace in tempering is described in detail in a booklet prepared by Leeds & Northrup Co. Photographs and data show the range of sizes in the line of Homo furnaces. Emphasis is laid on the advantages of the Homo method of tempering. Bulletin D-46.

Welded Pipe

The process used by Republic Steel Corp. in manufacturing electrically welded pipe and casing is described in a well illustrated booklet. A presentation of data on performance of the pipe under both laboratory and field tests is an interesting feature. Bulletin A-8.

Cyanides and Salts

Metallurgists will find valuable information in an 80-page booklet published by R & H Chemical Department of E. I. du Pont de Nemours Co. Technical information on the heat treatment of steels with cyanides and salts is presented in a lucid manner. Bulletin D-29.

Coated Electrodes

Murex heavy mineral coated welding electrodes, introduced recently by Metal & Thermit Corp., are discussed at length in a booklet prepared by that company. Numerous applications of inorganic flux coated electrodes and the advantages in their use are given. Bulletin S-64.

Scleroscopes

The model D standard recording scleroscope is described and illustrated in a recent publication of Shore Instrument Co. The theory and practice of hardness testing with this portable machine as described in this bulletin reveal a fund of valuable facts. Bulletin S-33.

How to Test Wear

Tests of lubricants or of wear of moving parts may be made accurately with a new machine, made by Timken Roller Bearing Co. A bulletin tells how the machine tests the load carrying capacity of lubricants and measures the friction and wear of materials. Bulletin M-71.

Cast Vanadium Steel

Jerome Strauss and George L. Norris have written a technical booklet for Vanadium Corp. of America describing the properties developed by steel castings containing various percentages of vanadium. The information given is complete and authoritative. Bulletin S-27.

Dissociating NH₄OH

The production of hydrogen and nitrogen by the dissociation of anhydrous ammonia has definite technical and economical advantages, says a recent publication of Ajax Electric Co. The dissociator is described and its action is clearly explained. Bulletin Ju-83.

Welded Construction

A booklet recently issued by Bethlehem Steel Co. describes the advantages of welded construction in building machinery parts from parts and shapes of rolled steel. The results are said to be sturdier and more economical construction. Bulletin J-76.

Temperature Control

Valuable engineering information on the subject of temperature control is contained in a well-illustrated 48-page booklet published by Foxboro Co. The extensive line of temperature controlling devices manufactured by the company is described. Bulletin S-21.

Q-Alloys

Authoritative information on alloy castings, especially the chromium-nickel and straight chromium alloys manufactured by General Alloys Co. to resist corrosion and high temperatures, is contained in one of that company's publications. Bulletin D-17.

New Microscope

A new low power binocular microscope is offered to metal men by Carl Zeiss, Inc. A booklet to describe it has been prepared. The new microscope is valuable in examining fractures, surfaces, etc., at magnifications from 4 to 31 diameters. Bulletin MIK-464e.

Recuperators

The complete story of recuperators built by Carborundum Co. for industrial furnaces is told in a readable booklet. The range of types available is described and the operating conditions are outlined in a clear manner. Bulletin F-57.

American Society for Steel Treating,
7016 Euclid Ave., Cleveland.

Please have sent to me the following literature as described under "Helpful Literature" in the January issue. (Please order by number.)

Name
Position
Firm
Address

TELLS PROGRESS IN MACHINING STEELS

I. F. Holland is Speaker at New Haven in December

By P. L. Clark

The November meeting of the New Haven chapter was held in Waterbury with the Waterbury section of the A.S.M.E. as invited guests.

Irwin F. Holland, superintendent of small tools division of Pratt & Whitney Co. gave a lecture on "The Machining Difficulties of Alloy Steels." As was pointed out many of our present alloys are the results of demands of engineers for materials of better physical properties with consideration for machining secondary. He outlined the progress of the last few years and stated that tools are now available to machine up to a Brinell hardness of 400 when necessary.

The effects of cutting lubricant on tool life and finish were discussed and samples demonstrating results shown. Mr. Holland accompanied his lecture by slides that pertained to the effects of grain size on machining.

Attendance was 100. S. C. Spalding, chairman, has appointed an attendance committee and expects a good showing at all future meetings. Major A. E. Bellis was technical chairman.

T. H. NELSON COVERS HEAT AND CORROSION RESISTANT STEELS

Addresses Cleveland Men Dec. 5

By H. B. Pulsifer

When Cleveland chapter met Dec. 5, nearly 70 assembled for the dinner. Chairman Van Horn presented Prof. A. A. Bates of Case School who outlined the course in modern metallurgy to be given for the members of the chapter beginning the last of January. By this time the audience had more than doubled.

The chairman then introduced Dr. T. Holland Nelson who spoke on "Heat and Corrosion Resistant Steels." Since Dr. Nelson has specialized in this field of metallurgy, he spoke authoritatively. Many of the fundamental and often obscure peculiarities of these alloys were disclosed in such a way as to be readily understood.

With a broad sympathy for the diverse interests of industry and science, Dr. Nelson reviewed the main classes of alloys and those chemical and physical peculiarities that fit certain types to definite fields of utility. His exposition of the carbide precipitation, alpha ferrite separations and crystal size effects were made clearly and convincingly. His statements were substantiated by charts of compositions and properties as well as by slides of actual equipment and micrographs and macrographs.

GAS FURNACE CATALOGUE

Many Types of Furnaces Described; For Your Copy, Write to A. S. S. T. offices

Furnaces and burner equipment manufactured by Surface Combustion Corp. are illustrated and described briefly in a new bulletin which shows the broad scope of the company's activities as makers of burners and both standard and continuous furnaces for annealing, carburizing, hardening, normalizing, nitriding and forging.

For a copy address A.S.S.T. headquarters, 7016 Euclid Ave., Cleveland.

Employment Service Bureau

Address answers care of A. S. S. T., 7016 Euclid Ave., Cleveland, unless otherwise stated

POSITIONS WANTED

METALLURGICAL ENGINEER: Ph. D. in physical metallurgy and chemistry. Exceptional training and wide experience in control and development of alloy and heat treated iron and steel castings and small tools and with manufacture of open hearth and electric steels. Available for position in charge of plant and sales development of castings or other steel products. Address 1-5.

SALES ENGINEER: Has had charge of specification and treatment of steels in tool division of large manufacturing plant. Would like similar position or road job with steel company as salesman, field service man or both. Address 1-10.

METALLURGIST: Has been night foreman of large heat treating department, plant metallurgist for steel mill and has had charge of heat treating wire. Experienced in stainless steel. Address 1-15.

STEEL MILL METALLURGIST: Case School graduate. Ten years on blast furnaces in charge of furnace operation, power plant, ore docks and sintering plant. Recently in development work in melting "carbon free" nickel-chromium ferrous alloys in all types of electric furnaces. Address 1-20.

METALLURGIST: Work has covered testing, treating and metallography, both ferrous and nonferrous. Research covers cast and malleable iron, high temperature testing, corrosion and heat treatment. Michigan graduate. Address 1-25.

SAYS ALLOY STEEL MELTS NOT YET UNDER SCIENCE'S THUMB

Hails Men as Quality Makers

By L. J. Strohmeier

E. C. Smith, chief metallurgist of the Republic Steel Corp., gave a very interesting talk before the Rockford chapter on Dec. 9. Covering "Alloy Steels from the Manufacturers' Viewpoint," he gave a clear and concise picture of the alloy steel manufacturers' position, their relation to the consumer, the tools they have to work with, some of the alloys, and the parts they play in supplying alloy steels to fit the customers' particular requirements.

Mr. Smith divided alloying elements into two groups, the deep hardening group and the shallow hardening group. The trick is to develop alloys containing the right elements in the correct percentages to give the best results for the multitudinous applications to which they are put by the consumer.

The chemistry and technique of alloy steel making, Mr. Smith stated, has a long way to go before it will be possible to control the heat by exact formula. At the present time, every mill has to depend on its melters and their colored glasses for the correct handling of the heats. Whether the heat is good or bad depends solely on the melter, which individual Mr. Smith described as a person having keen powers of observation—one able to tell by merely observing what the chemist and metallurgist with all their technical knowledge cannot forecast or control.

J. C. HENDERSON IN NEW WORK

J. C. Henderson, who obtained the first patents issued in this country on heat resisting castings of the nickel-chromium-iron group, has resigned from Driver-Harris Co., Harrison, N. J., to devote his time to an entirely new product.

Ajax Electrothermic Corp. has licensed Westinghouse Electric & Mfg. Co. to make high frequency or coreless induction furnaces or heaters for certain applications in the fields of heating. Ajax has in turn been licensed by Westinghouse to use certain patents of the latter company.

MONTREAL MEN HEAR DISCUSSION OF 18-8

C. M. Carmichael Makes Some Practical Recommendations

By Gordon Sproule

Montreal chapter held its regular meeting on Nov. 7. About 35 attended the dinner and 75 came in afterward. Between dinner and lecture, National Director C. F. Pascoe presented Chairman C. E. Herd with the President's bell, and he and Secretary Duncan MacInnes reported the fine impressions received at the Buffalo Convention.

The lecture was delivered by C. M. Carmichael, manager of stainless steel and alloys division, Shawinigan Chemical Co., who discussed "18-8."

After a brief historical introduction Mr. Carmichael explained the importance of a low carbon analysis and of preventing the precipitation of free carbides, especially in the grain boundaries. Disseminated precipitation, causing "All-Over" corrosion is not so dangerous as intergranular corrosion. Steel makers and sulphite pulp makers developed a very active discussion and Mr. Carmichael again had occasion to point out the false economy of underweight stainless sheet construction. There was a danger that the local cold work of repeated warping would destroy the corrosion resistance.

The question of the effect of combining or alternating stainless steel with bronze in pipe and fitting in sulphite liquor lines was raised and conflicting reports were given, but it would seem that lead-bearing bronze is more likely to cause failure of the stainless than plain bronze.

In melting, Mr. Carmichael prefers the arc furnace; some steel makers in the audience expressed strong preference for the high-frequency furnace, but it was agreed that experienced melting and moulding are very important in obtaining good results.

Mr. Carmichael recommended electric welding because the heat is quicker and more local, and there is no carbon pick-up. The bad effect on the structure and resistance to corrosion at critical points in the heat gradient from the weld was carefully explained.

The effect of gaskets and packing on the resistance of stainless was also referred to. Graphite, on account of its electro-negative property, and possibly on account of an initial reducing action, is very detrimental, but rubber, mica and other non-conductors are harmless.

CAN WE SHAVE WITH WC? SPEAKER ASKS

G. J. Comstock Discusses Hard Carbides at New Haven

By P. L. Clarke

The December meeting of the New Haven chapter, held in Bridgeport, was well attended and enjoyed by all. The regular meeting was opened by Chairman S. C. Spalding. H. G. Keshian, technical chairman for the evening introduced the guest speaker Gregory J. Comstock, director of research of the Firth-Sterling Steel Co.

His subject was "Recent Developments in Tungsten and Tantalum Carbides." Mr. Comstock spoke on the early uses of cast tungsten carbides and the rapid progress in Germany and at the General Electric Co. during the World War and later developments into the field of the cemented tungsten carbides.

The principles of coating, bonding and sintering of the tungsten powder, lamp black and cobalt were very clearly explained. Then possible uses of tantalum carbide for machining steel alloys of high Brinell were pointed out. The future application of the tungsten and tantalum carbides was discussed. Razor blades and other undeveloped products were spoken of.

Following the meeting the regular Christmas party with the drawing of donated presents was very appropriate and a source of good cheer. The attendance was 69.

LISTS AGE HARDENING USES

H. A. Bedworth, Talking at Schenectady, Gives Practical Applications

By L. L. Wyman

At the November meeting, the Schenectady chapter had the good fortune to have H. A. Bedworth of American Brass Co. as guest speaker.

Mr. Bedworth presented a very comprehensive talk on the phenomena of age-hardening and its applications to ferrous and non-ferrous metals. The changes in physical properties caused by the additions of comparatively small amounts of metals were graphically shown.

Mr. Bedworth's excellent talk was followed by a very lively discussion.

Chapter Chairmen and Secretaries

BALTIMORE
Chairman—Alex L. Field, Rustless Iron Corp. of America
Secretary—S. Proctor Rodgers, Consolidated Gas, Electric Light & Power Co.

BOSTON
Chairman—E. B. Ashworth, Bethlehem Shipbuilding Corp., Boston
Secretary—H. E. Handy, Saco-Lowell Shops, Biddeford, Maine

BUFFALO
Chairman—J. Robert Eves, 660 Grant St.
Secretary—T. H. Burke, Box 156

CANTON-MASSILLON
Chairman—Robert Sergeson, Republic Steel Corp., Canton
Secretary—N. L. Deuble, 31st & Cleveland, N. W., Canton

CHICAGO
Chairman—W. Mathiesius, Illinois Steel Co., 3426 E. 89th St.
Secretary—John Comstock, Room 1724-122 S. Michigan Ave.

CINCINNATI
Chairman—R. L. Kenyon, 2806 Elmo Place, Middletown
Secretary—N. C. Strohmeier, Tool Steel Gear & Pinion Co.

CLEVELAND
Chairman—K. R. Van Horn, Aluminum Co. of America, 2800 Harvard Ave.
Secretary—H. B. Pulsifer, Ferry Cap & Set Screw Co., Scranton Rd.

COLUMBUS
Chairman—L. S. Colby, 1180 E. Broad St.
Secretary—L. H. Marshall, 271 Winthrop Road

DAYTON
Chairman—C. E. Mentel, Jr., 424 West Hillcrest Ave.
Secretary—F. M. Reiter, Dayton Power & Light Co.

DETROIT
Chairman—C. J. Tobin, General Motors Research Laboratory
Secretary—Gordon Webb, Room 410, Donovan Bldg.

GOLDEN GATE
Chairman—Howard S. Taylor, Engineering Dept., Stanford University, Calif.
Secretary—R. S. Hirst, 2223 Channing Way, Berkeley, Calif.

HARTFORD
Chairman—J. H. G. Williams, Henry Souther Engineering Co.
Secretary—James Allison, Union Drawn Steel Co.

INDIANAPOLIS
Chairman—A. E. Focke, 5262 Kenwood Ave.
Secretary—R. L. Fitzsimmons, 1426 North Drexel Ave.

LEHIGH VALLEY
Chairman—O. V. Greene, Carpenter Steel Co., Reading
Secretary—H. Gifford, Bethlehem Steel Co., Bethlehem

LOS ANGELES
Chairman—Thos. S. Hutton, Electric Steel & Mfg. Co., 3534 E. Slauson
Secretary—Richard S. Smith, General Metals Corp., 5701 S. Boyle Ave.

MILWAUKEE
Chairman—Frank Kubosch, Thurner Heat Treating Co.
Secretary—J. Benton Druse, 4325 E. Kensington Blvd.

MONTREAL
Chairman—C. E. Herd, 257 Monkland Ave., Lachine, P. Q.
Secretary—Duncan G. MacInnes, 4992 Earncliffe Ave., Montreal, P. Q.

MUNCIE
Chairman—R. G. Hayler, 317 N. Vine St.
Secretary—E. M. Kingsley, Muncie Products Co.

NEW HAVEN
Chairman—S. C. Spalding, American Brass Co., Waterbury
Secretary—R. T. Porter, Heppenstall Forge Co., Bridgeport

NEW JERSEY
Chairman—A. McWilliams, J. McWilliams & Son, Jersey City
Secretary—John H. Johnson, 345 Mountain Ave., Springfield, N. J.

NEW YORK
Chairman—E. M. Wise, International Nickel Co., Bayonne, N. J.
Secretary—T. N. Holden, 1219 Glenwood Rd., Brooklyn

NORTHWEST
Chairman—R. L. Dowdell, University of Minnesota, Minneapolis
Secretary—Alexis Caswell, 100 Builders Exch. Bldg., Minneapolis

NOTRE DAME
Chairman—Edward W. Stanton, 325 Corby Hall
Secretary—John J. Kelley, 311 Corby Hall

ONTARIO
Chairman—C. L. Bailey, 59 Frederick St., Toronto
Secretary—L. F. Fitzpatrick, Flexible Shaft Co., Toronto

PHILADELPHIA
Chairman—Norman L. Mochel, 606 Thayer St., Ridley Park, Pa.
Secretary—A. O. Schaefer, Midvale Co., Nicetown, Philadelphia

PITTSBURGH
Chairman—S. L. Goodale, University of Pittsburgh
Secretary—H. L. Walker, Box 521, N. S. Sta.

RHODE ISLAND
Chairman—Robert G. Ashman, J. D. Crosby Co., Dean St., Pawtucket
Secretary—Carl G. Peterson, Providence Gas Co., Providence

ROCHESTER
Chairman—J. I. Reid, Symington Co.
Secretary—Irving C. Matthews, Eastman Kodak Co.

ROCKFORD
Chairman—C. B. Sadler, Barber-Colman Co.
Secretary—H. E. Habecker, Emerson-Brantingham Corp.

SCHENECTADY
Chairman—J. G. Hicks, American Locomotive Co.
Secretary—L. L. Wyman, General Electric Co.

SOUTHERN TIER
Chairman—R. B. Baker, Endicott Forge & Mfg. Co., Endicott, N. Y.
Secretary—W. S. Bennett, Elmira Water, Lt. & R. R. Co., Elmira

SPRINGFIELD
Chairman—Thomas P. Jones, Chapman Valve Mfg. Co., Indian Orchard, Mass.
Secretary—Earl H. Abbe, 17 Bayonne St., Springfield

ST. LOUIS
Chairman—E. H. Meyers, Western Cartridge Co., E. Alton, Ill.
Secretary—F. Dean Burnett, Leeds & Northrup Co., Railway Exchange Bldg.

SYRACUSE
Chairman—Sumner W. French, Syracuse Lighting Co.
Secretary—A. S. Vedder, Brace-Mueller-Huntley Co., Hills Bldg.

TRI-CITY
Chairman—Garnet Phillips, Frank Foundries Corp., Moline
Secretary—H. A. Deane, Deere & Co., Moline

WASHINGTON
Chairman—L. H. Fawcett, U. S. Naval Gun Factory
Secretary—S. J. Rosenberg, Bureau of Standards

WORCESTER
Chairman—Milton H. Frommann, Reed & Prince Mfg. Co.
Secretary—Theodore Packard, American Steel & Wire Co.

YORK
Chairman—A. W. F. Green, Yale St. & Elmwood Blvd.
Secretary—Chas. M. Strickler, General Machine Wks.

BOSTON HEARS J. C. HODGE ON WELDING PRESSURE VESSELS

150 Inspect New Liner

By Howard E. Handy

The December meeting of the Boston chapter was held on Dec. 2, at the plant of the Bethlehem Shipbuilding Corp., Quincy, Mass., where members were guests of Chairman E. B. Ashworth. During the afternoon the welding and steel fabricating departments were open for inspection and at 4 o'clock about 150 went aboard the magnificent Matson Pacific liner "Lurline" which was practically ready to sail on her maiden voyage. The beauty and workmanship of the ship were very impressive.

After dinner Dr. J. C. Hodge, chief metallurgist, Babcock & Wilcox Co., Barberton, O., gave an illustrated address on "Boiler Drums and Other Pressure Vessels of Welded Construction." The speaker has been closely associated with the development of welded vessels for high temperatures and pressures and his company pioneered in the application of non-destructive testing.

A large number of miscellaneous constructions for special purposes, involving the use of special steels and alloys, were discussed. He concluded by describing the work at the Hoover Dam. His company is constructing the penstocks for that project, which will constitute the largest single construction to date involving the use of welded joints made in accordance with the A.S.M.E. Code.

ARCHER TALKS ON ALUMINUM

Sketches Manufacture and Uses Before St. Louis Chapter in December

By F. D. Burnett

The December meeting of the St. Louis chapter was one of the most successful of the year. The men gathered to combine the serious business of the Society with the hilarity of the Christmas season.

An extremely interesting and educational talk on aluminum was delivered by R. S. Archer, director of metallurgy for A. O. Smith Corp., Milwaukee.

He sketched the production of aluminum, its metallurgy, its wide usefulness, and the factors affecting its use, and interested the technical as well as non-technical man.

MANUFACTURE AND PRACTICAL USE OF CARBIDES OUTLINED

York Men Hear Two Talks

By George J. O'Neill

Dr. Floyd C. Kelley, of the research laboratories of General Electric Co., addressed the York chapter at their regular November joint meeting with the Engineering Society of York. His subject was "Cemented Tungsten and Tantalum Carbides." The speaker was assisted by Mr. St. Clair, Philadelphia agent of Carboly Co., who described practical applications of these cutting materials.

Dr. Kelley dealt with the manufacture of the cemented carbides, describing how they are pressed to shape from metallic powder and fused or cemented together in hydrogen atmospheres at temperatures of 1550 to 1700° C., depending upon the percentage of binder material, cobalt, used.

Among the special applications mentioned by Mr. St. Clair was that of the grinding wheel dressing tool of diamond dust impregnated tungsten carbide. An outstanding example of the use of tantalum carbide in the non-metallic field is in stone turning and an instance of this may be seen in the stone columns of a new bridge in Philadelphia, which were fashioned on lathes using tantalum carbide cutting tools.

DETROIT GIVES 7 FREE METAL LECTURES TO ALL INTERESTED

First Lecture on Jan. 23

A series of 7 lectures on metallurgical subjects is being offered by the Detroit chapter to all who are interested. The course opens Jan. 23, Monday evening, at Detroit City College and continues every other Monday night. There is no charge for the course, all expenses being carried by the chapter.

Lectures will be given by A. L. Boegehold, J. M. Watson, Grover Eads, E. H. Stilwell, Mr. Weber, H. W. McQuaid, Floyd Harris and F. E. McCleary. Messrs. Hellebush and Hyslop will assist.

Subjects will cover the foundry, raw materials, forging, heat treatment, case hardening, equipment problems and physical tests.

What Should a Metallurgist Know About

PATENTS

Dr. A. W. Deller, a chemical engineer and patent attorney, has written a comprehensive yet easily grasped outline of the principles of patent law which the chemical or metallurgical engineer should know for his own protection. Chapter headings include:

- | | |
|--|--------------------------------------|
| I HISTORY, THEORY AND NATURE OF PATENTS | VI REMEDY OF DEFECTIVE PATENTS |
| II CLASSES OF PATENTABLE INVENTIONS | VII FORM AND CONSTRUCTION OF PATENTS |
| III PERSONS ENTITLED TO LETTERS PATENT | VIII INFRINGEMENTS OF LETTERS PATENT |
| IV PRINCIPLES OF PATENTABILITY | IX SUITS FOR INFRINGEMENT |
| V ACQUISITION AND TERMINATION OF PATENTS | X INCIDENTS OF OWNERSHIP OF PATENTS |
| | XI COMMERCIAL PHASES OF PATENTS |
| | XII FOREIGN PATENTS |

The book contains 483 pages and has numerous illustrations. In the foreword, Dr. L. H. Baekeland writes, "My own information about patent laws has been acquired slowly, after long years of experience and at the cost of some expensive blunders. I might have avoided all this if I had been able to avail myself of a book like Dr. Deller's."

"PRINCIPLES OF PATENT LAW"

For the Chemical and Metallurgical Industries

By Anthony William Deller

A.S.S.T., 7016 Euclid Avenue, Cleveland.

I enclose check for \$6.10 for a copy of *Principles of Patent Law* by Deller. The sum includes postage.

Signed _____

Street _____

City _____

THROWS LIGHT ON RAYS FROM RADIUM

Dr. C. S. Barrett Talks Gamma Rays to Philadelphians

By Adolph O. Schaefer

Undaunted by the prospect of a talk on a subject that means nothing to the layman, the Philadelphia chapter turned out in force on Jan. 6th. The speaker was Dr. C. S. Barrett of the Bureau of Metallurgical Research, Carnegie Institute, Pittsburgh. The subject was "Radiography with Gamma Rays."

Dr. Barrett's enthusiasm for his subject is tremendous and therefore infectious. His discussion begins with the discovery of X-rays, and on through the discovery of radium, down to the present time.

Dr. Barrett's enthusiasm for the gamma rays does not blind him to the uses of X-rays, which make clearer, more detailed pictures. The gamma rays are used to penetrate thicker masses of metal, and in applications where the use of X-ray tubes would be difficult or impossible. Comparative photographs were shown.

Dr. Barrett's discussion of the technique of radiography is interesting and instructive. He has many pictures showing the practical applications of gamma ray radiography.

The usual chapter dinner was addressed by Charles E. Bonine, associate director in charge of engineering, of the Franklin Institute Museum.

NEW JERSEY DEVOTES NOV. 14 MEETING TO ALUMINUM ALLOYS

Dr. Faragher Stresses Aging

By Ernest O. Olds

The New Jersey chapter met at Newark Nov. 14. About 140 heard Dr. Faragher, metallurgist for the Aluminum Co. of America, speak on the application and heat treatment of aluminum alloys.

He sketched briefly the development of this light metal and its application to many varied fields of industry. The advantages of aluminum alloys are its lightness, high heat conductivity, non-corrosive and structural properties.

Dr. Faragher described the effect of alloying constituents and of heat treatment on these alloys. Pure aluminum, for example, has a tensile strength of from 8000 to 9000 lbs. per sq. in., but an aluminum alloy of 4% Cu, 1/2% Mn and 1/2% Mg when worked, heat treated, and quenched would have a tensile strength of 45,000 lbs. with a 20% elongation. When this alloy is aged at room temperature for four days the tensile strength increases decidedly to about 80,000 lbs. The effect of age hardening is approximately 80% complete in 24 hours and 96% complete in four days at room temperatures.

ERECTION OF BIG BRIDGE IS DESCRIBED BY DR. BOYNTON

York Host to 6 Groups

By George J. O'Neill

The York chapter again had the pleasure of having Dr. H. C. Boynton, metallurgist of John A. Roebling's Sons Co., as their guest on Nov. 4, when he delivered a lecture on "The Span Supreme." His lecture was illustrated with moving pictures.

To those who had heard Dr. Boynton previously, his presence acted as an additional promise amply fulfilled at this lecture on the greatest of all bridges, the George Washington Memorial Bridge across the Hudson.

The chapter had as guests to hear Dr. Boynton's lecture the York Post of the American Legion, members of the Engineering Society of York, the Susquehanna section of the A.S.M.E., the Foremen's Club of York and the classes in metallurgy of the Y.M.C.A. of Harrisburg and of York, as sponsored by the York chapter.

FOR SALE

- 3 Rebuilt Model C Shore Scleroscopes
- 1 Rockwell Hardness Tester
- 2 Brinell Microscopes
- 2 Standard Brinell Machines
- 1 Power Operated Brinell Machine
- 1 Six-burner Laboratory Hot Plate
- 1 Yale Riehle Extensometer
- 1 Metallurgical Binocular Microscope

For details, address Box 1-50
AMERICAN SOCIETY FOR STEEL TREATING
7016 Euclid Ave., Cleveland

URGES MARKING MILL HEATS TO CUT PRODUCTION COSTS

G. C. Riegel is Tri-City Speaker

By R. H. Lind

G. C. Riegel, chief metallurgist of Caterpillar Tractor Co., Peoria, spoke Jan. 10 before 50 members of Tri-City chapter on the interesting subject of "Metallurgical Selection and Heat Treatment in Caterpillar Plants."

Mr. Riegel began by showing the many and varied tests required in determining the cause of failure. These include the usual static tests or analysis plus the increasingly important dynamic tests.

Mr. Riegel stated that the parts made from each mill heat as received from the mill and accepted at the plants are marked for future identification which gives clear records of performance of that heat in service. Mr. Riegel said that this method of setting up limiting qualities or minimum requirements and the identification system of mill heats at first appears costly, but they have found the increased uniformity of the steel helps their plant production schedules and service requirements, which are, in the final analysis, the deciding factors.

Colonel H. W. Schull, commanding officer of the Rock Island Arsenal, gave a brief interesting talk on the importance of National Arsenals both in peace and war.

TELLS HOW STEELS ACT AT HIGH HEAT

N. L. Mochel Addresses Joint Meeting of Lehigh Men

By O. V. Greene

On Jan. 6, the Lehigh Valley chapter and the Engineers Club of the Lehigh Valley held their annual joint meeting. The subject, "Steels at Elevated Temperatures," was one of wide interest to nearly all engineers, and consequently the meeting was extremely profitable and instructive.

The address was given by N. L. Mochel, Westinghouse Electric & Mfg. Co., of Philadelphia. His remarks were divided roughly into the following general headings. All of these subdivisions refer to characteristics at elevated temperatures:

Short time tensile tests, creep tests, fatigue, relaxation, embrittlement, seizing and galling, expansion, and the application of these data to practical problems.

In the application of the fundamental information we have in regard to this subject, Mr. Mochel in conclusion said that the engineer must work intelligently. There are many structures, where creep is a factor, that can be satisfactorily fabricated by means of welding or by making slight changes in mechanical design and thus eliminate the problem of obtaining a material with very low creep characteristics.

TRI-CITY MEN FOLLOW STEEL FROM MINE TO FINAL PRODUCT

L. S. Marsh Explains Processes

By R. H. Lind

L. S. Marsh, manager, department of inspection and metallurgy, Inland Steel Co., Chicago, brought before the Tri-City chapter on Dec. 8, an interesting and educational discussion of the many processes in the manufacture of steel.

Mr. Marsh's discussion led from the ore mines to the boats and then into the harbor of their huge steel plant. From this point his subject was moulded around slides showing the large stationary equipment in the plant and four moving picture reels showing the movement of the ore through its many processes as it was turned into commercial steel.

The pictures even went into the details of inspection of the finished product. These coupled with Mr. Marsh's thorough knowledge and ability to clearly explain the many details imparted to the 50 members present a fine understanding of the steel manufacturing process.

Coach H. V. Almquist of Augustana College, former all-American football player, from Minnesota added much to the interest of the evening with talk on coaching and sportmanship in college football.

H. J. KICHERER MOVES TO PEORIA

H. J. Kicherer, Caterpillar Tractor Co., has moved to Peoria from Minneapolis with the transfer of his company's road machinery division plant. Mr. Kicherer had been chairman of Northwest chapter since June, 1932.

DESCRIBES METAL MOLD CASTINGS

F. R. Francis Tells Properties in Ontario Address

By J. W. McBean

At the December meeting of the Ontario chapter in Hamilton the coffee talk was given by G. A. M. Galilee of Canadian Westinghouse Co. on the timely subject of the photo-electric cell.

The technical paper was "Non-ferrous Metal Mold Casting" by F. R. Francis of Canada Metal Co. Tin base alloys are used in accurate motor car and aircraft bearings, also for soda fountains and similar work. Lead base alloys are good for resisting corrosion of mineral acids but lack strength.

With zinc base alloys, remarkable progress has been made. Tensile strength may now be 50,000 lb. with no trouble from warping and growth. Great accuracy as well as strength and toughness can be obtained. A sample was shown bent 180 deg. in a comparatively short radius.

Aluminum base alloys form an important group. In the pressure casting, dissolved gases may have hardly time to escape from the mold, especially in heavy sections. In such cases by the use of a different composition and the gravity method, sound castings may be obtained. For pressure casting the alloys of aluminum, silicon and nickel are favored, while for gravity casting the aluminum-copper alloy is used. One of the newer aluminum alloys, containing copper, chromium and molybdenum, is very resistant to acid corrosion and takes a high finish.

Copper base alloys have only recently been utilized in the metal mold field. An alloy used for pressure casting gives a tensile strength of 65 to 75,000 lb. The gravity cast alloy gives a tensile strength of 75 to 80,000 lb. The copper-aluminum alloys have their tensile strength increased by heating and quenching.

SLUSHING OILS DEFY RUST 10 YEARS, WASHINGTON MEN HEAR

December Meeting Draws Crowd

By C. W. Briggs

The December meeting of the Washington chapter was of double interest with the result that a large attendance was present. E. M. Converse of Dearborn Chemical Co. spoke on "Slushing Oils." This subject proved of great interest to the government engineers especially those of the Army and Navy who have to deal with the problem of protecting machinery and equipment parts against corrosion.

Mr. Converse gave special consideration to the subject of metal protection against corrosion during periods of inactivity especially where the equipment was exposed to moist conditions. The history of slushing oils was traced by Mr. Converse from 15 years ago when slushing oils were anything to prevent rust on metal during shipment for very short intervals to the present day when metal surfaces are protected from 5 to 10 years without corrosion. Chromium compounds are used as inhibitors and various types of petrolatum make for ease in application.

The other feature of the evening was the presentation of the Bausch & Lomb Optical Co. movie film "Eyes of Science." The film dealt with the science of optics and the production of optical parts and their application.

FUTURE OF AIRSHIPS IS TOLD BY GREAT ZEPPELIN DESIGNER

Dr. Arnstein Cleveland Speaker

By H. B. Pulsifer

On Nov. 7 the Cleveland chapter joined with the local section of the S.A.E. and asked Dr. Karl Arnstein, the eminent designer of Zeppelins, to give his version of the future of air transportation.

Some 300 heard the address of the evening. Chairman Van Horn of the Steel Treating first introduced T. S. Kemble of the S.A.E. who, in turn, introduced James H. Herron as honorary chairman of the evening. Mr. Herron then presented Dr. Arnstein who began a capable account of the function of dirigibles in the future of transportation.

Dr. Arnstein then illustrated the development of such craft. His slides and movie films showed the progress from the balloons sent out of Paris in the siege of 1870 to the recent flights of the new "Akron." Especially good were the films of the early Zeppelins and the details of the "Akron."

CLEVELAND CHAPTER HAS FREE METALS COURSE FOR MEMBERS

First of 12 Lectures Jan. 30

Cleveland chapter is sponsoring a course of 12 lectures on metallurgy for its members at Case School of Applied Science. Dr. A. A. Bates, a member of the Case faculty, is conducting the course, which begins Jan. 30. Meetings will be held at Case School.

Lectures will be given by Dr. Bates, Dr. K. R. Van Horn, and Messrs. J. V. Emmons, H. P. Croft and H. A. Schwartz.

The course covers the fundamentals of ferrous and copper metallurgy and metallography. It offers a simple and comprehensive survey of these fields for members not having had metallurgical training, and includes present practice and recent developments so as to afford a current review for those having had experience along these lines.

Only members of the Cleveland chapter in good standing may register upon presentation of their A.S.S.T. membership cards. The course is free.

TELLS RESEARCH LEADING TO PRACTICAL BRIGHT ANNEALING

Cowan Speaks at Indianapolis

By R. L. Fitzsimmons

The Indianapolis chapter held their December meeting on the 7th. The J. D. Adams Co. presented motion pictures demonstrating the various operations in the manufacture, assembly and testing of a motor road grader.

The speaker of the evening was R. T. Cowan, Surface Combustion Corp. His subject was, "Furnace Atmospheres, Their Effect on Metals and Their Control." He told of the interesting laboratory experiments leading up to the discovery of practical methods for bright annealing brass, copper and steel.

Mr. Cowan showed slides of various furnaces used in bright annealing, carburizing and forging. He also showed the microstructure of both case and core of steels carburized in various gaseous atmospheres.

A considerable amount of discussion followed the talk.



\$1.00

Brings These Books to You

If this were the only set of the NATIONAL METAL LIBRARY printed, it would cost a fabulous sum. Actually, thousands of sets have been printed and you may buy one for very little. The total cost is only \$16.00. \$1.00 brings you the books, the balance in 5 easy monthly payments of \$3.00 each.

The heat treatment and metallurgy of iron and steel, elusive and complex subjects, are clearly explained. Selection of steels, nitriding, quenching, carburizing, inclusions and similar subjects are covered in detail. Valuable production data by eminent authorities is given in each book. The eight books present the whole story.

Lectures on Steel and Its Treatment by John F. Keller

A blacksmith who by long and careful study has mastered the mysteries of iron and steel so that he makes them understandable through homely similes and every day comparisons.

Principles of Heat Treatment of Steel by the Metallurgical Staff, Bureau of Standards

Presents the basic reasons for the behavior of steels when heated, cooled or quenched. It contains a comprehensive bibliography, a great aid in studying specific problems.

Heat Treatment, Uses and Properties of Steel by H. B. Knowlton

Assistant Chief Metallurgist of International Harvester Co. covers the various plain carbon and alloy steels, their selection and properties obtainable by various treatments. The author goes at length into the peculiarities of each steel, methods and equipment for handling, carburizing, heat treating and cleaning.

The Constitution of Steel and Cast Iron by Frank T. Sisco

Editor, Alloys of Iron Research, explains in his clear, understandable manner the metallurgical functions of carbon and the common alloying elements, the effects of heat treating and variations in alloy content to secure internal structures that give desired physical properties. Cold working, carburizing and treating of worked and carburized steels are presented at length.

The Quenching of Steels by H. J. French

In charge of steel development, The International Nickel Co., clarifies this subject. Cooling mediums are classified. The effect of size and shape of work in process and sources of variation in hardening are presented in detail. Gives a simple means of selecting proper cooling solutions; also tables for determining internal and surface condition of steels after quenching.

Nitriding Symposium, papers presented by several authorities at the Convention of the A.S.S.T., reviews the possibilities of this process, selection of nitriding steels and proper application of the process.

Inclusions in Iron by Dr. C. R. Wohrman

Is a careful study of the common inclusions, their nature and effect.

The Application of Science to Industry by Dr. W. H. Hatfield

Director, Brown-Firth Research Laboratories, England, is an interesting review of British steel making and rolling practice. He discusses many of the common steels. Chapters on steel at elevated temperatures and tool and cutlery steels contain much valuable data.

The cost is \$21.50 if books are purchased separately.

NATIONAL METAL LIBRARY costs only \$16.00

\$1.00 Brings You the Books—The balance in easy

monthly payments of \$3.00 each. For cash deduct 10%

To: The American Society for Steel Treating,
7016 Euclid Ave., Cleveland, Ohio.

Please send me sets of the NATIONAL METAL LIBRARY, 10 days free examination, postpaid in U.S.A. and Canada.

Please check:

- ☐ \$1.00 enclosed for down payment, balance \$3.00 monthly, for next 5 months.
- ☐ Enclosed is cash in full (deduct 10% for cash)
- ☐ Please bill me and I will remit promptly and in full (deduct 10% for cash)

Name

Street and No.

City State

TELLS THEORY OF CARBURIZING STEEL

Diederichs Opens Lehigh Talk by Explaining Kinetic Heat

By O. V. Greene

On Dec. 2 the Lehigh Valley chapter had an extremely profitable meeting in Reading which was addressed by W. J. Diederichs, metallurgist of Autocar Co., Ardmore, Pa., who talked on carburizing and case hardening.

Mr. Diederichs opened his remarks by giving a very clear and concise explanation of some of the fundamentals of physical metallurgy, starting with the kinetic theory of heat as a basis. To quote, "The kinetic theory of gases starts from the assumption that gas molecules are in rapid, irregular motion; similarly the electrons inside of metal possess a kinetic energy which is equal to that of gas molecules at the same temperature. This assumption requires a very great velocity as compared to gas molecules. Of course the higher the temperature the greater the velocity." Mr. Diederichs next passed to larger units and explained in detail the crystallinity of metals, solid solutions, grain growth and allotropy.

The carburizing process was next described as essentially one of a reaction between iron and CO. Mr. Diederichs showed that plain carbon steels are not as good for heavy duty gears, for instance, as some of the alloy steels. Many of these alloy steels have a critical temperature of case and core so close together that it is not necessary to use the double treatment. Considerable data was presented to show the difference between the core properties of single treatment as compared to double treatment.

Mr. Diederichs brought with him a very fine exhibit, which included carburized gears, pinions, and complete rear end and transmission box assemblies for an Autocar truck.

W. H. BASSETT COVERS COPPER ALLOYS AT BUFFALO MEETING

Stresses Fabrication Methods

By T. H. Burke

The Buffalo chapter had the pleasure of hearing William H. Bassett, metallurgical manager of American Brass Co., at the November meeting. His subject was "Non-Ferrous Metallurgy."

The talk was preceded by a film entitled "Mine To Consumer." This gave a clear picture of mining copper ore, the processes of concentration, smelting, refining of metal, making the brass mixtures and finally the varied methods of fabrication.

Acting Chairman Llewellyn then called on C. H. Bierbaum to introduce Mr. Bassett, his intimate friend of long standing. Mr. Bassett dealt principally with the copper alloys and their fabrication as wrought and sand cast. His talk was accompanied by numerous charts giving the mechanical properties of the various alloys, constitutional diagrams and metallographic data. He also expounded the latest theories regarding age hardening of the copper alloys.

There were 75 members and guests present.

A. V. DeFOREST DEVELOPS TEST

A. V. de Forest, 898 Madison Ave., New York, has developed the Magnaflux test for discovering incipient fatigue cracks and locating seams and discontinuities and also a new Scratch Extensometer, a method of control in the field where load conditions cause failure.

KRIVOBOK TELLS VAGARIES OF SOME HEAT RESISTING ALLOYS

Speaks to Canton-Massillon Men

By N. L. Deuble

On Nov. 17, Dr. V. N. Krivobok, assistant professor of metallurgy at Carnegie Institute, gave a very interesting talk before the Canton-Massillon chapter on "Heat Resisting Alloys."

This was divided into a discussion of low carbon 12-14% chrome steels, low carbon 16-18% chrome steels and low carbon 18-8 steels. Dr. Krivobok showed graphs indicating that the first two are border-line alloys and that from materials of almost the same analysis, widely different physical properties are obtained. This cannot always be accounted for by the analysis and he feels that there is a great deal to be learned in making and handling these alloys. He illustrated that in some cases, acceptable ductility with low strength is obtained, while in other instances, high strength and low ductility were obtained.

He then illustrated the effect of nickel on 18% chrome steel, showing the depression of the critical point by the addition of nickel until it was below room temperature. This talk was exceedingly interesting. There were approximately 40 for dinner and 60 at the meeting.

DESCRIBES GAS CARBURIZING PROCESS TO CINCINNATI MEN

R. J. Cowan is December Speaker

By N. C. Strohenger

R. J. Cowan, metallurgical engineer of Surface Combustion Co., Toledo, spoke on the subject of "Gas Carburizing" at the December meeting of the Cincinnati chapter. He briefly touched upon the rotary gas carburizing furnace that has been used at numerous plants. Mr. Cowan talked most of the time on the continuous Eutectrol furnaces used to carburize with gas combined with a chamber to allow the work to reach the desirable temperature for quenching without decarburizing occurring.

He mentioned how the eutectic structure is obtained by the absolute control of the gas atmosphere in these furnaces. Various installations of these furnaces and their construction as well as the equipment and controls necessary were fully explained. Microscopic structures of the steels carburized by the Eutectrol method were compared to those usually present by other methods of carburizing.

Mr. Cowan accompanied his talk with slides that made it very interesting and easily followed. After a valuable discussion the speaker was given a rising vote of thanks.

NOTRE DAME STUDIES MINES

Hear How Canadian Nickel and Gold Mining Operations are Conducted

By James J. Kelley

The Notre Dame group held its second meeting of the year Dec. 8. Professor Smith, head of the Mining Engineering Department, addressed the assembly on "Canadian Nickel and Gold Mines."

The older and newer methods of roasting, blast furnace operation, settling, concentrating, and final refining were explained in detail. Professor Smith illustrated the structure of the veins in which the deposits are found, and explained the method of locating new veins. The past and modern-day methods of crushing, grinding, and separating of the valuable metals from impurities, as well as the methods of final refining of gold and silver were explained in detail.

F. F. LUCAS TELLS OF HIS TECHNIQUE

New York Hears of Advances in Microscopy of Metals

By F. H. Clark

New York chapter held its January meeting on the 16th. After dinner at Loft's restaurant, the members gathered to hear F. F. Lucas speak on "Some Advances in Microscopy." Pictures were shown of the large camera at the Bell Telephone Laboratories built to utilize ultra violet radiation whereby much higher resolution can be obtained than with the use of ordinary light. Constituents in the microscopic structure of metals are more clearly shown under the ultra violet light not only because of the increase in resolving power but also because of differences in their selective absorption of the light. Thus variations in the degree of tempering of hardened steel are evident by this new method which would not be visible with ordinary light.

Mr. Lucas described his work in studying particle size of carbides in steel. The chromium carbides may be separated from their matrix of steel, centrifuged and their electric charges neutralized in order to get dispersion of the particles. They then may be examined by means of the slit-ultra microscope in a water suspension at about 300 diameters magnification. The particles show as bright spots in a dark field. For higher magnifications, the carbides may be mounted like biological specimens on a glass slide and examined by transmitted light under ultra violet radiation.

A third method used by Mr. Lucas is the usual metallographic polishing, etching and examination with monochromatic radiation at about 12,000 diameters arranged for opaque objects with specially corrected objectives and oculars of the very highest accuracy. Mr. Lucas prefers a camera with a highly corrected ocular of low magnification and a bellows about 15 ft. long.

An enormous amount of work has been done in counting particle size of iron and chromium carbides and a comparison of the three methods made. Mr. Lucas believes the metallographic and the ultra violet microscopes have given most accurate results for particle size.

WHAT'S COMING UP IN METAL PROGRESS

New "Alloy 548" and Bolts to Headline Next Two Issues

The new "Alloy 548" features the February number of *Metal Progress*. Introduced at the January Cleveland chapter meeting by Dr. Zay Jeffries and W. P. Sykes, respectively, consulting metallurgist for General Electric Co. and metallurgist for Cleveland Wire Works of that company, the new cutting material promises to take its place between high speed steel and the cemented carbides.

Mr. Sykes will describe the alloy's metallurgical features in the article, and Dr. Jeffries will discuss its applications.

A. L. Feild, president of Alloy Research Corp., whose experience in melting stainless steels is wide, indeed, has written an authoritative article on this subject for the February number.

Non-ferrous metallurgy is not neglected in this issue. M. H. Medwedoff, metallurgist for A C Sparkplug Co., has written an exposition of the forming properties of brass.

A feature of the article on spark testing by W. G. Hildorf and C. H. McCollam of Timken Steel & Tube Co., is the illustrations which are actual photographs of spark streams prepared at the Bureau of Standards.

Precision scales are built of many heat treated parts, and the February *Metal Progress* has an article by W. J. Burr of Toledo Precision Devices, Inc., which describes the treatments and the equipment used.

In the March number, bolts will be featured. Harry B. Pulsifer, Ferry Cap & Set Screw Co., will describe in general the materials used for cold heading. Copper and brass wire for cold heading will be discussed by D. K. Crampton, research director of Chase Brass & Copper Co. An evaluation of tensile tests on threaded sections will be made by E. M. Slaughter, National Acme Co.

Also in the March number will be an interesting article on the forging of stainless by R. W. Thompson, chief metallurgist of Transue & Williams.

Other articles and interesting correspondence from metallurgists in all parts of the world will help maintain *Metal Progress'* high editorial standards.

VOL. 20 TRANSACTIONS INDEX NOW READY FOR DISTRIBUTION

Ask National Office for Yours

Indexes to Vol. XX of *Transactions* have been prepared and will be sent without charge to all members requesting them.

Vol. XX covers the issues of *Transactions* from July, 1932, through December, 1932. Members who wish to have their copies bound in blue cloth to match previous bound volumes should send their loose copies to the National Office together with \$2.00 to cover cost of binding. Missing numbers can be supplied from the files at the National Office at \$0.50 each.

Complete bound copies of Vol. XX will be supplied for \$5.00 to those who wish to have a bound book for their libraries and at the same time retain their copies in loose form.

SHEET METAL TALK AT YORK FEATURES AUTO BODY SHEETS

Joseph Winlock is Speaker

By F. J. Allen and G. J. O'Neill
The annual Lancaster meeting of the York chapter was held Dec. 14 at the Brunswick Hotel. Fifty members and guests participated in the dinner served before the meeting. Among the guests were Tom Moore, vice-chairman of the Philadelphia chapter, and Gustav Peterson, past chairman of that chapter.

The lecturer of the evening was Joseph Winlock, metallurgist of the Edward G. Budd Co., Philadelphia, whose subject was "Metal Stampings."

Mr. Winlock's experience has been extensive in the specification and actual use of sheet metals. Discussing the varying characteristics of the different types of sheet steel, and stressing sheets for automobile bodies, he described how these characteristics were employed in industry. He had much original information to give on the forming of sheets. The lecture was excellently illustrated by several reels of motion pictures.

W. J. CROOK WRITES ON SPECTRA

Dr. Welton J. Crook, professor of metallurgy at Stanford University and past chairman of the Golden Gate chapter, has had published by Stanford University Press a "Table of Arc Spectrum Lines Arranged in Order of Wave Length." This book will be of much assistance to those engaged in metallurgical spectrum analysis.

Inland Steel Co., Indiana Harbor, Ind., has placed an order with Surface Combustion Corp. for one oil-fired sheet normalizing furnace. The furnace has a capacity of approximately 140 tons per 24 hour day.

MONTREAL MEN TALK OVER WELDING KINKS

Discuss Number of Points in Arc and Gas Welding

By Gordon Sproule

The monthly meeting of Montreal chapter was held Jan. 9. By the time the technical meeting had started the room was crowded to capacity.

The technical session opened with a moving picture film showing the development of electric arc welding. The discussion developed into a friendly controversy between foundrymen and welding men.

The difficulty of arc welding grey iron castings was brought up, and was explained from the metallurgical point of view, the chief factor being the difficulty of having the added weld metal and the fused parent metal solidify slowly enough to give a grey iron and not a chilled iron.

A contribution from Thomas Firth and John Brown, Ltd., gave detailed practical instructions for arc welding stainless steel. It was also reported that heavily flux-coated electrodes of analyses to give deposits the same as the parent metal were being increasingly used.

Gas welding has important fields, and many of these were enumerated, particularly for cutting. In repair shops it is popular on account of the lower first cost of the equipment.

American Electric Furnace Co., Boston, has appointed Thomson Tool & Supply Co. as Indiana representative, with offices in Odd Fellow Bldg., Indianapolis.

On Jan. 1 of this year, Associated Alloy Steel Co., Inc., closed its offices. Products of three constituent companies, Ludlum Steel Co., Watervliet, N. Y., Sharon Steel Hoop Co., Sharon, Pa., and Timken Steel & Tube Co., Canton, O., are now marketed through the respective sales organizations.

For Sale LEITZ Micro-Metallograph

We have available at a very attractive price, a slightly used Leitz "Micro-Metallograph," complete with all accessories, guaranteed to be in perfect condition.

Address Box 1-70

AMER. SOCIETY FOR STEEL TREATING
7016 Euclid Ave., Cleveland

A Real MICROSCOPE for .. \$5.00

● Magnifications 40X-50X-60X
—Shaped like an oversized fountain pen—Operated and held by one hand—With improved pocket clip. Carried like fountain pen.

Hundreds of times you have wanted to see the crystals of a fracture—how a weld appears—or how a minute crack was formed—and the plant microscope was not available, or else there was none.

● We have sold our microscopes to the U. S. Government, hundreds of the largest concerns in America and Canada and shipped to Sweden and the Belgian Congo.

● Used for field work by metallurgists, chemists, geologists, by salesmen to show fine points of their products. Purchased by universities, colleges and medical schools.

SAME TYPE INSTRUMENT MAGNIFYING 80X-100X-120X—\$7.00

The cost—complete—is only \$5.00

You may have one for 5 days trial. If not entirely satisfactory your money will be promptly refunded upon receipt of the microscope by us.

THE RIPLEY COMPANY

3419 Tullamore Road, Cleveland Heights, Ohio

Please send me postpaid, the following:

-----Ripley microscopes @ \$5.00 each -----cash enclosed herewith

-----Ripley microscopes @ \$7.00 each -----please send C. O. D.

Name-----

Street and No.-----

City-----State-----

Rated Concerns Shipped on Approval



Has fine worm focus adjustment

\$2 Binds Your

TRANSACTIONS

Members who wish to preserve Vol. XX of *Transactions* in bound form should send their copies to National Headquarters together with \$2 which covers the cost of binding in blue cloth to match previous bound volumes.

If any member wants to keep his copies of the issues of Vol. XX, July, 1932, through December, 1932, in loose form and yet have a bound volume for his library, a complete bound volume will be supplied for \$5, postpaid.